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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service

TOBACCO:
DIFFERENCES BETWEEN EARLY-SEASON AND FINAL ESTIMATES OF SUPPLY AND DEMAND FACTORS USED IN MAKING OUTLOOK FORECASTS 1/

by

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SUMMARY

Forecasts of production of tobacco by class and type are made by the Crop Reporting Board beginning in July. These forecasts are based on estimated acreage and the condition of the crop or the probable yield expected by producers on the first of the month, and assume average weather, disease, and insect conditions for the remainder of the growing season. Forecasts then are issued in successive months through harvest.

In the July report, for example, the Crop Reporting Board reports the production of flue-cured tobacco, types 11-14, that is expected as of July 1. Many unpredictable factors, such as hail, excessive rain, and drought, during later months may cause final production to differ from that expected as of that date. Naturally, no account can be taken of these events; the best assumption is that conditions during the remainder of the season will be average. The economic analyst wants the best estimate of the crop as of July 1, based on what is known thus far in the marketing season. Assuming no consistent statistical bias in the forecasts, the best indication of actual production as of that date is the figure contained in the report released by the Crop Reporting Board. At the same time, however, the economic analyst wants some idea of the reliability of these forecasts. He wants to know (1) what proportion of the factors that affect final production is known, on the average, by July 1, and is therefore reflected in the forecast of the Crop Reporting Board; and (2) what proportion is unknown and hence may affect the final outturn during the remainder of the season.

1/ The research on which this report is based was carried on under authority of the Agricultural Marketing Act of 1946 (RMA, Title II).

This is the fourth report in a series of studies that give information of this type. Reports covering wheat, rye, and rice, AMS-38; oilseeds and fats and oils, AMS-63; and feed grains and hay, AMS-129, can be obtained by writing the Division of Marketing Information, Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.

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We are concerned in this report with providing measures of this type, both for the Board's estimates and for certain other factors that are taken as "given" in price analysis work.

Analyses of leaf tobacco indicate no significant statistical bias in early-season forecasts. As would be expected, differences between early-season and final figures, on the average, diminish steadily as the season advances (fig. 1). Only in the case of flue-cured tobacco, types 11-14, are year-to-year indications based on the estimate issued in December closely associated with year-to-year changes in the estimate issued the following May. For this tobacco type, more than 99 percent of the year-to-year variation in the following May is accounted for by the December estimate. Analyses of other types produce associations that average about 90 percent in December.

The crop year for most types of leaf tobacco begins in October, but the year for flue-cured and cigar wrapper tobaccos begins in July. Irrespective of the particular months involved in the crop year, however, advance forecasts of probable changes in the level of disposable income from the preceding crop year account for 85 to 90 percent of the actual variation.

Forecasts of stocks of leaf tobacco as of the start of the crop year and total disappearance, by types, appear in certain issues of The Tobacco Situation. As in forecasts of crop harvests, differences between early-season and final figures at the end of the crop year, on the average, diminish steadily as the season progresses. Analyses of data available for the 1946-54 period indicate that, with the exception of Maryland, dark air-cured, and cigar binder tobaccos, changes in estimates of stocks at the beginning of the respective crop years are associated with at least 97 percent of the changes in actual data. For total disappearance, however, relationships based on data issued near the close of the crop year produce associations of at least 97 percent only for flue-cured and cigar wrapper types.

Background of Study

Analyzing future trends in prices is an important function of situation and outlook work. Analyses are often published before harvest to guide producers and handlers in planning operations during the marketing season. They are brought up-to-date as the marketing season progresses. Their reliability depends on (1) knowledge of the basic relationships that prevail between price and certain "causal" variables, such as supply and general business conditions, and (2) the agreement of the early-season estimates of these causal factors with later or final estimates.

The research project discussed here is a first step in measuring factors that affect the reliability of early-season estimates of future price trends. It is designed to measure systematically the relationships between early-season forecasts of domestic supply and demand variables and the final figures. In connection with an analysis of this kind, a problem arises because forecasts of causal factors used in preparing situation and outlook reports frequently are not systematically recorded. Although forecasts, with

qualifying remarks, are given in earlier Situations for each year, analyses reported here are confined only to those factors for which forecasts have been recorded in tabular form. They include Crop Reporting Board forecasts and estimates of production of tobacco; forecasts and estimates of stocks and disappearance of leaf tobacco and products published regularly in The Tobacco Situation; and forecasts of trends in general business conditions, particularly personal disposable income, issued for use within the United States Department of Agriculture by the Farm Income Branch of the Agricultural Marketing Service.

Historical series for the several items were compiled with the cooperation of members of the staffs of the agencies that initially prepared them; they also assisted in planning the study and reviewing the results. Methodology pertaining to analyses that follow is similar to that for oilseeds and fats and oils. It is outlined in detail in a publication relating to these items. 2/

Disposable Income

Each fall and spring the Farm Income Branch of the Agricultural Marketing Service prepares forecasts of the principal series that relate to overall economic conditions for about a year ahead. These forecasts are intended for use by commodity analysts and other research workers within the Agricultural Economics Division who prepare outlook and situation reports. A record of these forecasts from 1948 to the present time is available on ditto sheets. Discussions of the forecasts are found in the files of The Demand and Price Situation, in which such discussions are carried regularly. Estimates of disposable income by quarters are prepared by the Department of Commerce and published in the Survey of Current Business. Revisions of income data appear in February and July issues, and later revisions are published from time to time as new series and new methods are developed. These frequently result in moderate changes in level for all or part of the series. Because of these changes in level and irregularity in timing of the revisions, forecasts of the series are compared with the first revision issued after the date of forecast. Thus, for analytical purposes, the forecast and its revisions have the same base. As noted in paragraphs to follows, this procedure is similar to that in which comparisons are made for forecasts of production published by the Crop Reporting Board.

For some studies of future trends in prices, emphasis is placed on the average level during the crop year; for other studies, it is placed on the average level during shorter time periods, such as fall or spring. The terms, "crop" and "marketing" year, are used interchangeably in this report. As an indication of the accuracy of the forecasts of general economic conditions in relation to these two types of studies, two sorts of comparisons were made: (1) Relationships between forecasts of the season-average (or calendar year) level of the factor and the revised figure for the crop (or calendar) year and (2) relationships between the forecast for a specific quarter and the revised

2/ Weingarten, Hyman. Oilseeds and Fats and Oils: Differences Between Early-Season and Final Estimates of Supply and Demand Factors Used in Making Outlook Forecasts. U. S. Agricultural Marketing Service AMS-63. 1956.

quarterly figure. The 4 quarters within the year need not be distinguished one from another in an analysis of this sort as all of the general economic series are adjusted for normal seasonal variation.

The period for which recorded forecasts are available is short. Hence, as indicators of the exact degree of difference between the early-season forecasts and the revised estimates, these analyses are less reliable than those based on forecasts made by the Crop Reporting Board. For this reason, results are not shown in tabular form and the discussion in the following paragraphs is given in general rather than specific terms. Because of the outbreak of the Korean conflict, 1950 forecasts were underestimated. As an abnormal observation in a short series can distort statistical results, data for 1950 were excluded from these analyses.

As discussed in AMS-63, 3/ one way to study the relationships between early-season forecasts and revised or final estimates is in terms of the percentage of associated variation in the two series. Analyses in each case are based on year-to-year changes in the estimates associated with forecast changes from the preceding year.

Crop years for flue-cured and cigar wrapper types begin July 1; all other types, October 1. The fall forecast of disposable income, usually made in October, can be regarded as an early-season forecast when data are compiled on a crop-year basis in either case. For these years, between 85 and 90 percent of the variation in year-to-year changes in the revised estimate was associated with the fall forecast, and almost 98 percent with the spring forecast issued approximately 6 months later. Timing of the forecast in relation to the estimate is somewhat different when working with calendar-year averages. Nevertheless, between 85 and 90 percent of the variation in the revised estimate is associated with the forecast issued in the preceding fall, about 95 percent in the current spring, and about 98 percent in the current fall.

In analyzing data by quarters, no distinction was made between forecasts issued in fall or spring. Instead, the forecasts were classified as those made 1 quarter in advance, those 2 quarters in advance, and so on. As of the date of forecast, data would not be issued for the current quarter; in effect this represents a forecast on the part of the analyst and is classified as a quarter in advance. The percentage of variation in year-to-year changes in revised estimates associated with the forecast change from the preceding year was more than 99 percent for those forecasts made 1 quarter in advance, approximately 90 percent for those 2 quarters in advance, and about 80 percent for forecasts 3 and 4 quarters in advance.

3/ Ibid, p. 11

Production Forecasts for Tobacco

The first forecast of production is published by the Crop Reporting Board in July; similar forecasts are issued monthly thereafter through November. These forecasts are based on estimated acreage and the condition of the crop or the probable yield expected by producers on the first of the month, assuming average weather, disease, and insect conditions for the remainder of the growing season. The estimate of production issued in the December annual summary report can be considered preliminary for flue-cured tobacco (types 11-14) and type 62 of the cigar wrapper tobaccos--most of each crop has been marketed by December. On the other hand, marketing for most other types is far from complete at this time; for some, marketing has not yet begun. Consequently, another estimate is published for all types of leaf tobacco in the following May. As the May figure appears to be more meaningful than the December estimate for most tobacco types, it was selected as the basis for computation of differences between early-season forecasts and the first firm estimate. A revised estimate is published in the report for the next December and a further revision, based on census benchmark data every 5 years, is made as soon as possible after such data become available. In this study we refer to the several sets of estimates here described, respectively, as "following May," "revised December," and "final" figures.

Differences Between Early-Season and Final Production Estimates.--One way in which differences between early-season forecasts and final production estimates can be studied is in terms of the standard deviations of such differences. With the kind of data analyzed in this study, the size of the standard deviation directly indicates the size of the differences of any given monthly forecast from the following May production estimate. 4/ On the average, differences that are greater than the computed standard deviation occur approximately one-third of the time. In 1 year out of 20, differences are expected to exceed two standard deviations; differences greater than three standard deviations are rare.

A July forecast of flue-cured tobacco, for example, was first published in 1932. Based on data for 1932-54, the computed standard deviation of the difference between this forecast and the following May estimate is 74 million pounds, or 8 percent of an average crop for the period. In 10 out of 23 years, the actual differences (plus or minus) were greater than 74 million pounds; they were less in the remaining 13 years. In only 1 out of 23 years was the actual difference greater than 148 million pounds--two standard deviations. In no case was the actual difference greater than three standard deviations. Thus, empirical results for this tobacco type roughly approximate what is expected from statistical theory.

4/ A standard deviation is a measure of the amount of scatter or dispersion about an average. It is characteristic of a normal distribution that the average plus or minus one standard deviation ordinarily includes about two-thirds of the observations. In this study, the average difference over a long period of time is assumed to be zero.

For the August forecast, the standard deviation of its difference from the following May estimate is 51 million pounds. This declines to 45 million pounds in September, to 42 million pounds in October, to 35 million pounds in November, and to 16 million pounds in December. Figure 1 shows standard deviations in million pounds for the periods 1932-54 and 1946-54. The 1946-54 period is studied so that comparisons can be made with data that apply to recent years. The downward slope of the lines for the 1932-54 and 1946-54 periods is about the same.

Table 1 shows standard deviations in actual units and in terms of percentages of an average crop for each type included in this study for specified periods. As a percentage of the crop, the standard deviations of differences are somewhat higher for total fire-cured tobacco (types 21-23), burley tobacco (type 31), and total dark air-cured tobacco (types 35-37) than for other types. However, none exceeds the percentage representing year-to-year changes in the final estimate.

Percentage of Year-to-Year Changes in Production Predicted by Early-Season Estimates.--Another way to study the usefulness of the early-season production forecasts in connection with price or utilization forecasts is in terms of the percentage of variation of the year-to-year changes in production that can be forecast by making use of early-season estimates. These are shown in detail in table 2 and summarized in figure 2 using a consistent time period for the various types.

Using monthly forecasts of production for 1932-54, 88 percent of the year-to-year variation in the following May estimate of production of total flue-cured tobacco (types 11-14) is associated with the July forecast, but this percentage increases to 94 in August, 96 in October, 97 in November, and more than 99 percent in December. The analyses for total fire-cured tobacco (types 21-23) show that the first forecast in July is associated with 79 percent of the year-to-year changes in the May production estimate, and this increases to 81 in August, 90 in September, 93 in October, and 95 in December. For burley tobacco (type 31), the July forecast is associated only with 62 percent of the year-to-year variation in the following May figure; this increases to 76 by October and to 87 percent by December. The July forecast of production of Maryland tobacco (type 32) is associated also with 62 percent of the year-to-year variation in the following May estimate. However, this percentage increases to 92 percent by October and remains approximately at this level through December. Analyses of total dark air-cured tobacco (types 35-37) for July indicate that it is associated with 81 percent of the variation in the following May figure. This increases to 90 percent in October and to 93 percent in December. Percentage adjustments after the following May estimate have been 1 percent or less with the exception of Maryland and total dark air-cured tobaccos. An average adjustment of 5 percent was made with the revised December figure for Maryland tobacco, and of 2 percent in total dark air-cured tobacco when census data became available.

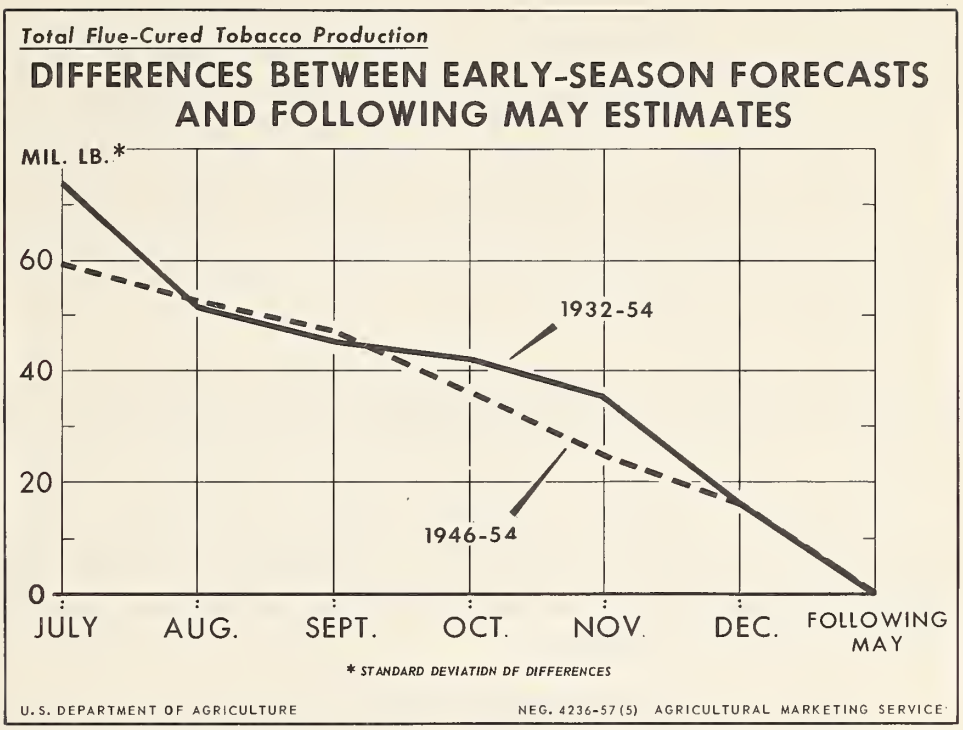

Figure 1

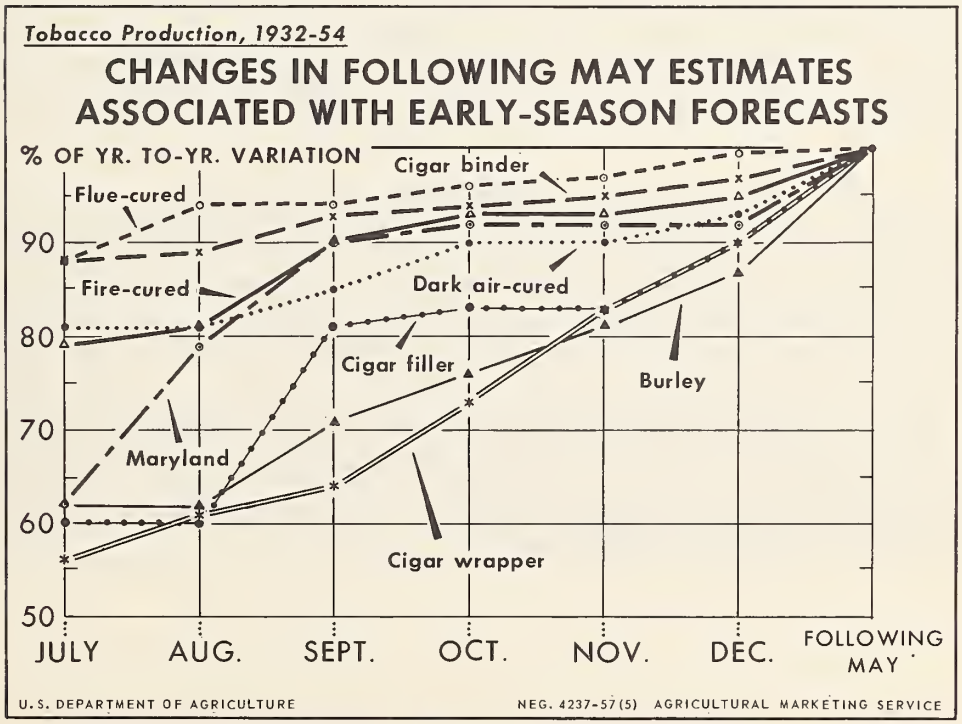

Figure 2

About 60 percent of the variation in July is associated with the following May figure for cigar filler tobacco (types 41-45). This percentage rises to 83 percent in October and to 90 percent by December. The first estimate in July for cigar binder tobacco (types 51-55) is associated with 88 percent of the year-to-year variation in its May estimate, increases to 94 by October, and to 97 percent in December. Analyses for cigar wrapper tobacco (types 61-62) show that only 56 percent of the year-to-year variation in the following May figure is associated with the July forecast, but this increases to 73 percent in October, 83 percent in November, and 90 percent by December. For cigar tobaccos, percentage adjustments after the following May estimate have been 5 percent or less.

Results of a Test for Statistical Bias.--Most analysts use production forecasts as the best early-season indication of the probable size of a crop. This procedure is valid only when the regression coefficient between the crop and the forecast, or between the change in the crop and the change in the forecast, is close to 1, and the constant value in the equation is close to zero. The usual Student's t-test for statistical significance was made, and it was found that coefficients for most of these crop forecasts do not differ significantly from the above criteria. Thus, no significant statistical bias is indicated for these forecasts.

Stocks and Disappearance of Leaf Tobacco and Products

The Tobacco Situation was published first in July 1937. From that date to 1946 a number of analysts, in turn, were assigned responsibility for writing the Situation. This led to certain inconsistencies in presentation of data and methods of estimation. Since 1946, however, such responsibility has been delegated to one analyst; therefore, the period 1946-54 was selected for study. These analyses are based on data that first appeared in the tables relating to leaf tobacco and products published in Situations as outlined below. Other--less exact--forecasts can be found in the text statements of earlier Situation reports for any year. But as these are usually qualified, none is included here.

Although timing of release dates has varied in this period, four publications normally are issued each calendar year. From 1946 to 1953, the first Situation appeared in January or February; the second in March, April, or May; the third in July or August; and the fourth in September or October. Release dates in 1954 were changed again and now Situations are issued in March, June, September, and December. Because of these changes, data for the analyses described here were compiled on the basis of the first, second, third, or fourth issue for any particular calendar year. As release dates have been altered so that current publications are issued 1 or 2 months later, it is reasonable to expect that on the average estimates carried currently in the various tables are more closely associated with final figures than may be indicated by the results shown here.

Two factors that were reported regularly in the nine years under study are stocks as of the start of the crop year and total disappearance of leaf tobacco. These are found in the tables on supply and disappearance for each type. Domestic consumption of leaf tobacco is listed also, but the period for which data are available is shorter. Calendar and fiscal year estimates relating to various tobacco products also appear regularly now, but these data are not available for long periods either. They include total output, domestic consumption, and total tax-free removals of cigarettes; total output, total tax-paid removals, and total tax-free removals of cigars; and total output of smoking tobacco, chewing tobacco, and snuff. Results of analyses for stocks and total disappearance are given in tabular form; those for other series are summarized in the text. One note of caution must be emphasized. Analyses for all data are based on relatively few observations, and for this reason they provide only a general notion as to the actual relationships existing between the variables studied.

Beginning with the third issue of each Situation, forecasts of stocks of leaf tobacco, as of the start of the crop year, are given in tables for individual types. All forecasts before 1954 were made in July or August. These data are therefore assumed to represent estimations made before the start of each crop year for all types normally on an October-September year. The next issue--the fourth Situation--gives the second estimate for stocks. Subsequent revisions appear in the first and second issues published in the following year. In the case of total flue-cured, however, early forecasts represent advance estimation before release of the official stock reports only for the first 3 years of the series. Starting with 1949, Situations were issued after the release of the stock report. Consequently, the flue-cured figure reported in the Situation in the remaining 6 years was known as of the publication date. Subsequent paragraphs indicate that this timing arrangement accounts for almost perfect associations in the analyses for types 11-14.

The first forecast of total disappearance of leaf tobacco is made just before the end of the crop year. It appears in the third Situation report (July or August) for the following calendar year. A revision is carried in the next issue at the close of the crop year.

Methodology for these analyses differs slightly from that given earlier, as early-season forecasts are compared directly with the final estimate; in the studies referred to previously, advance forecast were compared with the following May estimate. In all cases, the most recently revised data as of the time of these analyses are taken as the final estimate for the respective series.

Standard deviations on series for stocks and total disappearance are shown in table 3 in terms of million pounds and as a percentage of the average for the series. Percentagewise, the standard deviations of differences between the first forecast and final estimate for stocks are moderately large for Maryland, dark air-cured, and cigar binder tobaccos. For the total disappearance series, differences are large for Maryland, dark air-cured

cigar filler and cigar binder tobacco types. Nevertheless, standard deviations of differences stay within the range of normal year-to-year fluctuation in all cases.

A similar pattern exists for the various short series referred to above. Standard deviations as a percentage of averages are large in some cases but none exceed normal year-to-year variation. The dispersion represented by the standard deviation of the first estimates of domestic consumption of leaf tobacco for fire-cured, burley, and dark air-cured types; and first calendar-year estimates for total output and domestic consumption of cigarettes; total tax-free removals of cigars; and total output for smoking tobacco, chewing tobacco, and snuff; represents approximately half the normal year-to-year variation for each series.

Early-season forecasts on stocks and total disappearance of tobacco were studied also in terms of the percentage of variation of year-to-year changes in the various series that can be forecast by making use of such early estimates. These results are given in table 4. As indicated previously, closer associations might have resulted had the release dates for earlier publications coincided with current release schedules. Also, longer series of data would have produced more reliable results, although not necessarily higher correlations.

As expected, the degree of association was more than 99 percent for stocks of total flue-cured tobacco at the start of the crop year in July. Analyses of total fire-cured, burley, cigar filler, and cigar wrapper tobacco types suggest that the first tabular estimate of stocks in each case is a good forecaster of respective final estimates too. Associated variation was found to be 97 percent or more for each of these four tobacco types. On the other hand, year-to-year changes in the first forecast of stocks before the start of the crop year for Maryland tobacco are associated with 84 percent of the year-to-year changes in its final figure; for total dark air-cured tobacco, only 75 percent; and cigar binder, 82 percent. Second estimates in the September or October issue of the Situation, after the start of the respective crop years, generally improve these associations. Estimates of stocks given in the next issue of the Situation in the following January or February are actually tabulated totals and, as such, differ negligibly from the final figure in all cases.

Data used in the analyses of total disappearance begin with an estimate made in the following July or August, or a few months before the end of the crop year for most types. In the case of total flue-cured tobacco, however, estimates represent data collected just as its year is drawing to a close. Consequently, more than 99 percent of the year-to-year variation is associated with its first tabular estimate. For a similar crop-year period, the first estimate for cigar wrapper types accounts for 95 percent of the variation in its final figure; the next estimate accounts for 97 percent.

Results for the remaining types are not so close. Analyses of these remaining tobacco types indicate that the first estimate for total fire-cured tobacco accounted for 89 percent of the variation in the final figure. The second estimate increases this to 91 percent. Associations between changes in the first tabular estimate and changes in the final figure for other types range between 48 and 74 percent. Some improvement in these percentages occurs with the second estimate.

Tabular estimates of domestic consumption for most classes of leaf tobacco are published concurrently with estimates of total disappearance. Once again, extremely close results are indicated for total flue-cured tobacco, as more than 99 percent of the year-to-year changes in the final estimate is associated with changes in the first estimate. For the other types, an average of about 75 percent of the variation in the final estimate is associated with the first estimate. The second estimate is associated with about 80 percent of the year-to-year variation in the final estimate for total fire-cured, about 90 percent for burley, almost 85 percent for Maryland, and only 60 percent for total dark air-cured tobaccos. Estimates of domestic consumption of the cigar types are not available for the full period studied.

Calendar-year estimates for the various short series for cigarettes (output, domestic consumption, and tax-free removals) are estimated and reported for the first time in tabular form before the end of the year. A revision is given in the first Situation report in the next year. About 90 percent of the year-to-year variation in the final figure is associated with the first estimate for total output and domestic consumption, and about 80 percent for total tax-free removals. The second estimate for each series increases these percentages to 99 percent or more. First estimates account for about 65 percent of the year-to-year variation in the final estimate for smoking tobacco, about 85 percent for chewing tobacco, but less than 50 percent for snuff. The revision in the following year increases the percentages of associated variation to more than 99 percent for smoking tobacco and snuff; chewing tobacco remains at a level of 85 percent, as before. No analyses for cigars were conducted because of insufficient data.

Fiscal-year estimates are also made for the above series. The first estimate appears in the Situation issued just before the end of the fiscal year. Results indicate that year-to-year changes in the estimate are associated with approximately 95 percent of the year-to-year variation in the final figure for total output and total tax-free removals of cigarettes, and about 90 percent in the case of domestic consumption of cigarettes. The first estimate for smoking tobacco is associated also with approximately 95 percent of the variation in its final figure. When revisions are published after the close of the fiscal year, each of these associations is increased to more than 99 percent. Insufficient data prevent the study of other series.

Season Average Prices

In other reports in this series, 5/ analyses are given of relationships among preliminary estimates of season-average prices issued on specified dates. Such estimates for tobacco, by types, are not issued. Estimates are published by the Crop Reporting Board in the following May and again in the following December after the receipt of marketing data. Because differences in these successive estimates are negligible, analyses of season-average prices are not needed.

5/ Op. cit., p. 1.

Table 1.- Production of leaf tobacco, by types: Standard deviations of differences between following May estimates and specified early-season forecasts and of year-to-year changes

Item	Total flue-cured (Types 11-14)				Total fire-cured (Types 21-23) 1/				Total light air-cured: Burley (Type 31)				Total light air-cured: Maryland (Type 32)			
	1932-54		1946-54		1932-54		1946-54		1932-54		1946-54		1932-54		1946-54	
	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/
	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.
Difference between--:																
Following May estimate and forecast in--																
July	74	8	59	5	9.5	11	11.3	16	59	13	60	10	4.6	14	3.8	9
August	51	5	52	4	9.2	11	10.6	15	61	14	60	10	3.7	11	3.9	10
September	45	5	47	4	7.0	8	9.0	13	55	12	52	9	2.7	8	3.5	8
October	42	4	36	3	6.1	7	7.5	11	49	11	50	9	2.3	7	3.1	8
November	35	4	24	2	6.3	7	7.4	11	45	10	45	8	1.8	5	2.1	5
December	16	2	16	1	5.1	6	5.3	8	40	9	36	6	.7	2	.6	1
Revised December	.7	3/	0	0	1.6	2	.4	1	2	3/	2	3/	2.4	7	2.3	6
Revised December and final estimate	4	3/	.3	3/	1.8	2	.4	1	5	1	.5	3/	1.0	3	.5	1
Year-to-year changes in final estimate	209	21	141	11	22	26	22	31	93	21	94	16	9	28	10	25

Item	Total dark air-cured (Types 35-37)				Cigar filler (Types 41-44) 4/				Cigar binder (Types 51-55) 5/				Cigar wrapper (Types 61-62)			
	1932-54		1946-54		1932-54		1946-54		1932-54		1946-54		1932-54		1946-54	
	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/	Actual	Percentage 2/
	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.
Difference between--:																
Following May estimate and forecast in--																
July	5.0	14	4.2	12	7.8	14	5.2	9	3.4	6	3.1	5	1.0	9	0.8	6
August	5.4	15	4.7	14	8.0	14	4.9	8	3.3	6	2.2	4	.9	8	.7	4
September	4.8	13	4.1	12	5.6	10	2.6	4	2.6	5	2.3	4	.8	7	.9	6
October	3.9	11	2.6	8	5.2	9	2.4	4	2.4	5	2.6	4	.8	7	.8	5
November	4.0	11	2.6	8	5.3	10	2.0	3	2.1	4	2.2	4	.6	5	.5	4
December	3.7	10	2.4	7	2.3	4	1.2	2	1.9	4	1.8	3	.4	4	.5	4
Revised December	.3	1	.1	3/	2.6	5	2.4	4	.8	1	1.2	2	.2	2	.1	1
Revised December and final estimate	1.0	3	.4	1	3.9	7	3.8	6	2.0	4	1.7	3	.1	1	.1	1
Year-to-year changes in final estimate	11	31	7	20	12	22	9	15	11	20	7	13	1.2	11	1.3	9

1/ Includes type 24 through 1949. 2/ Standard deviation expressed as a percentage of average crop reported in December following. 3/ Less than 0.5 percent. 4/ Includes type 45 through 1939; also Pennsylvania type 53 reported as type 41 since 1950. 5/ Includes type 56 through 1948.

Table 2.--Production of leaf tobacco, by types: Percentage of variation in year-to-year changes in specified estimates associated with specified early-season forecasts 1/

Item	Total flue-cured (Types 11-14)		Total fire-cured (Types 21-23) 2/		Total light air-cured: Burley (Type 31)		Total light air-cured: Maryland (Type 32)		Total dark air-cured (Types 35-37)		Cigar filler (Types 41-44) 3/		Cigar binder (Types 51-55) 4/		Cigar wrapper (Types 61-62)	
	1932-54	1946-54	1932-54	1946-54	1932-54	1946-54	1932-54	1946-54	1932-54	1946-54	1932-54	1946-54	1932-54	1946-54	1932-54	1946-54
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Change in following May estimate associated with change in production forecast in--																
July	88	83	79	82	5/62	59	62	82	5/81	5/53	5/60	74	88	75	56	71
August	94	5/86	81	83	5/62	61	79	82	5/81	5/53	5/60	77	89	5/84	61	5/71
September	94	5/86	90	88	71	5/81	90	95	85	62	81	94	93	5/84	64	5/71
October	96	94	93	94	76	5/81	5/92	5/96	5/90	5/86	5/83	5/95	94	5/84	73	71
November	97	97	93	95	81	85	5/92	5/96	5/90	5/86	5/83	5/95	95	87	83	85
December	99.5	99.0	95	97	87	94	5/92	5/96	93	89	90	5/95	97	91	90	90
Change in revised December estimate associated with following May estimate	99.9	99.9	99.5	99.9	99.9	99.9	95	98	99.9	99.9	97	95	99.4	97	97	99.3
Change in final estimate associated with revised December estimate	99.9	99.9	99.0	99.9	99.5	99.9	99.0	99.8	98.0	99.6	96	96	96	97	98	97

1/ See text for exact variables used.
2/ Includes type 24 through 1949.
3/ Includes type 45 through 1939, also Pennsylania type 53 reported as type 41 since 1950.
4/ Includes type 56 through 1948.
5/ Average value; coefficients exhibited erratic pattern but successive values did not differ from each other by a statistically significant amount.

Table 3.--Stocks and total disappearance of leaf tobacco, by types: Standard deviations of differences between final and specified early-season estimates and of year-to-year changes for crop years, 1946-54 1/

Item	Total flue-cured (Types 11-14)				Total fire-cured (Types 21-23) 2/				Total light air-cured							
									Burley (Type 31)				Maryland (Type 32) 3/			
	Stocks 4/		Total disappearance		Stocks 4/		Total disappearance		Stocks 4/		Total disappearance		Stocks 4/		Total disappearance	
	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/
	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.
Difference between --																
Final estimate and forecast in months for --																
Current calendar year:																
July-August	1.8	6/	---	---	4.4	3	---	---	14.2	1	---	---	3.0	6	---	---
September-October	0	0	---	---	3.1	2	---	---	10.6	1	---	---	2.5	5	---	---
Following calendar year:																
January-February	0	0	---	---	.2	6/	---	---	1.3	6/	---	---	.9	2	---	---
March-May	0	0	---	---	.2	6/	---	---	1.3	6/	---	---	0	0	---	---
July-August	0	0	1.9	6/	.2	6/	3.6	5	0	0	13.4	2	0	0	3.1	9
September-October	0	0	.3	6/	.2	6/	3.0	5	0	0	9.5	2	0	0	2.2	6
Year-to-year changes in final estimate	98	6	78	7	20	14	10	15	51	5	20	4	8	14	4	10

Item	Total dark air-cured (Types 35-37)				Cigar filler (Types 41-44) 7/				Cigar binder (Types 51-55) 8/				Cigar wrapper (Types 61-62)			
	Stocks 4/		Total disappearance		Stocks 4/		Total disappearance		Stocks 4/		Total disappearance		Stocks 4/		Total disappearance	
	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/	Actual	Percentage 5/
	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.	Mil. lb.	Pct.
Difference between --																
Final estimate and forecast in months for --																
Current calendar year:																
July-August	3.0	4	---	---	9/1.9	1	---	---	4.4	4	---	---	0.2	1	---	---
September-October	2.4	3	---	---	9/1.9	1	---	---	3.6	3	---	---	.2	1	---	---
Following calendar year:																
January-February	.7	1	---	---	.7	6/	---	---	.4	6/	---	---	0	0	---	---
March-May	.7	1	---	---	.2	6/	---	---	.3	6/	---	---	0	0	---	---
July-August	.7	1	3.0	9	.2	6/	9/3.8	7	.3	6/	5.0	9	0	0	0.3	2
September-October	.7	1	2.5	8	.2	6/	9/3.8	7	.3	6/	4.5	8	0	0	.2	1
Year-to-year changes in final estimate	6	8	5	12	12	9	6	10	10	8	8	14	1.6	9	1.2	9

1/ Situation reports currently are released 1-2 months later than for most years on which these analyses are based; hence, standard deviations probably are smaller for data in current reports than shown here. Data on crop-year basis beginning as follows: Types 11-14 and 61-62, July 1; all other types, October 1. 2/ Includes type 24 through 1949. 3/ Stock data as of January 1 for period 1937-49; as of October 1 for 1950-54. January 1 stocks now are required for marketing quota computations of supply. 4/ Stocks as of the start of the marketing season for all types except type 32 as indicated. 5/ Standard deviations as a percentage of the average final estimate for the period. 6/ Less than 0.5 percent. 7/ Includes type 45 through 1939; also Pennsylvania type 53 reported as type 41 since 1950. 8/ Includes type 56 through 1948. 9/ Average value; coefficients exhibited erratic pattern but successive values did not differ from each other by a statistically significant amount.

Table 4.--Stocks and total disappearance of leaf tobacco, by types: Percentage of variation in year-to-year changes in final estimates associated with specified early-season forecasts for crops years, 1946-54 1/

Item	Total flue-cured (Types 11-14)		Total fire-cured (Types 21-23) 2/		Total light air-cured: Burley (Type 31)		Total light air-cured: Maryland (Type 32) 3/		Total dark air-cured (Types 35-37)		Cigar filler (Types 41-44) 4/		Cigar binder (Types 51-55) 5/		Cigar wrapper (Types 61-62)	
	Stocks 6/	Total disappearance	Stocks 6/	Total disappearance	Stocks 6/	Total disappearance	Stocks 6/	Total disappearance	Stocks 6/	Total disappearance	Stocks 6/	Total disappearance	Stocks 6/	Total disappearance	Stocks 6/	Total disappearance
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Change in final estimate associated with forecast in months for--																
Current calendar year:																
July-August	99.9	---	97	---	97	---	84	---	75	---	7/98	---	82	---	99.0	---
September-October	99.9	---	98	---	97	---	93	---	86	---	7/98	---	87	---	99.0	---
Following calendar year:																
January-February	99.9	---	99.0	---	99.9	---	99.6	---	99.0	---	99.9	---	99.9	---	99.9	---
March-May	99.9	---	99.0	---	99.9	---	99.9	---	99.0	---	99.9	---	99.9	---	99.9	---
July-August	99.9	99.9	99.0	89	99.9	69	99.9	7/48	99.0	63	99.9	7/64	99.9	7/74	99.9	95
September-October	99.9	99.9	99.0	91	99.9	79	99.9	7/48	99.0	73	99.9	7/64	99.9	7/74	99.9	97

1/ Situation reports currently are released 1-2 months later than for most years on which these analyses are based; hence, percentages of associated variation probably are higher for data in current reports than shown here. Data on crop-year basis beginning as follows: Types 11-14 and 61-62, July 1; all other types, October 1.

2/ Includes type 24 through 1949.

3/ Stock data as of January 1 for period 1937-49; as of October 1 for 1950-54. January 1 stocks now are required for marketing quota computations of supply.

4/ Includes type 45 through 1939; also Pennsylvania type 53 reported as type 41 since 1950.

5/ Includes type 56 through 1948.

6/ Stocks as of the start of the marketing season for all types except type 32 as indicated.

7/ Average value; coefficients exhibited erratic pattern but successive values did not differ from each other by a statistically significant amount.